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(54) Title of Invention: Production Method of Packaging for Semiconductor Equipment

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(72) Inventor: Katsuhiko Akiyama

c/o, No. 35 Sony Corporation

7, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo-to, Japan

(72) Inventor: Tetsuo Ono

c/o, No. 35 Sony Corporation

7, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo-to, Japan

(72) Inventor: Yuji Kajiya

c/o, No. 35 Sony Corporation

7, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo-to, Japan

(71) Applicant: Sony Corporation K.K.

7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo-to, Japan

(74) Representative: Masaru Tsuchiya (Lawyer), and two (2) other members

Detailed Descriptions:

1. Title of Invention:

Production Method of Packaging for Semiconductor Equipment

2. Scope of Patent Claims:

The production method of packaging for semiconductor equipment, which is characterized as being equipped with semiconductor equipment on the substrate that is composed of such a material that is possible for a selective etching, tying up the connecting wire with the above-mentioned semiconductor equipment as well as putting together the external electrode parts of the connecting wire with the extreme end of the external electrode parts of the above-mentioned substrate, and resin molding all together the above-mentioned connecting wires on the above-mentioned substrate, as well as removing etching from the above-mentioned substrate in the last stage.

3. Detailed Descriptions of Invention:

Areas of Industrial Applications:

This invention is in regard to the production method of packaging for semiconductor

equipment.

The background technologies and their problems:

Conventionally, the so-called chip-carrier type packaging has been used widely as one of the methods for producing packaging on the printed substrate with high accuracy. This method is of a lead-less type packaging method, through which an electrode, which is being extended to the rear surface of the packaging, is connected directly to the conductor pattern on the printed substrate by soldering.

There are two (2) types of methods in this chip-carrier type packaging, namely, a ceramic type method and plastic type method. However, not only that the packaging made by the ceramic type method is expensive, but also it has such a disadvantage that a cracking and/or peeling might occur at the connections between the ceramics and above-mentioned soldering parts and/or the conductors, due to the

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differences of their coefficient of thermal expansion during the temperature cycle, when soldered directly to the printed substrate. On the other hand, however, although the packaging by the plastic type method is less expensive, it also has such disadvantages that a heat dissipation capacity is being poor, as well as the shape itself is not suitable for the automation of the packaging.

In Fig. 1, the construction of this conventional plastic type chip-carrier packaging is shown. This packaging (1) is produced in such a way that by dropping a liquid epoxy resin from the above, onto the parts, after having connected both ends of the chip (4) and electrode (2) through a wire bonding method with small size wires (5) of Au, after setting the chip (4), which is

consisting of the semiconductor equipment, onto the printed substrate (3), on which the electrode (2) of copper film is being formed in advance.

At this packaging (1), the resin layer (6) and printed substrate (3) surround the chip (4). Since the heat resistance of these resin layer (6) and printed substrate (3) is relatively higher, the heat that is generated by the chip (4) while it is working cannot be removed effectively towards outside of the packaging (1). That is to say that, the heat dissipation characteristic of the packaging (1) is poor, and it is one of the disadvantages of this particular component. Moreover, when the liquid resin epoxy is dropped onto the parts from above, as mentioned previously, it is pretty difficult to control the small specific amount of liquid dropping at a higher speed with a constant manner, thus making it very difficult to handle the packaging (1) with an automated mode.

On the other hand, there is a packaging that is called as a tape-carrier type packaging, which is different from the chip-carrier type packaging. Compared with the conventional type of chip-carrier type packaging, this type of packaging has such an advantage that the unit can be made much smaller. However, it also has some other disadvantages as such that, the heat dissipation characteristic is poor, as the chip is totally covered by the resin layer, as well as it requires a special equipment as being employed with a tape.

The Objective of the Invention:

The objective of this invention is that, to provide a production method of packaging for semiconductor equipment, which has a high heat dissipation capacity as well as with more reliable capabilities, so that the above-mentioned conventional problems can possibly be solved.

The Outline of the Invention:

The production method of packaging for semiconductor equipment, which is related to this

invention is characterized as being equipped with semiconductor equipment on the substrate that is composed of such a material that is possible for a selective etching, tying up the connecting wire with the above-mentioned semiconductor equipment, as well as putting together the external electrode parts of the connecting wires with the extreme end of the external electrode parts of the above-mentioned substrate, and resin molding all together with the above-mentioned connecting wires on the above-mentioned substrate, as well as removing etching from the above-mentioned substrate in the last stage. By doing it this way, it is possible that to produce the lead-less type packaging for semiconductor equipment, which has a high heat dissipation capacity as well as with more reliable capabilities, through an automated, simple, and less expensive way. The external electrode parts, which are mentioned above may be represented by the above-mentioned connecting wires, and/or may be separated from the above-mentioned connecting wires, and be connected to the above-mentioned connecting wires.

Implemented Examples:

In the following, the production method of packaging for semiconductor equipment, which is related to this invention is described by using some sketched diagrams based on the implemented examples.

Fig. 2A ~ 2D are showing the process diagrams to explain the production method of packaging for semiconductor equipment, which is related to this invention by using No. 1 Implemented Example. In the following, the process is explained starting from Fig. 2A and in order.

First of all, in Fig. 2A, the Au layer (12) of thickness 1 [μ], Ni layer (13) of thickness 1 [μ], and Au layer (14) of thickness 3 [μ] are plated on top of the substrate (11) of Fe in order, and installed the chip connection part (16) and external electrode parts (17) (18), which are consisting of the chip (15) for the semiconductor equipment, onto the specific locations of the chip connection

part (11g) and external electrode connection parts (11h) (11i) on the above-mentioned substrate (11), respectively.

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In Fig. 3, the plan view of the above-mentioned substrate (11), on which the process that is shown in Fig. 2A has been completed, is shown. Next, in Fig. 2B, after having installed the chip (15) onto the above-mentioned chip connection part (16), connect the chip (15) and above-mentioned external electrode parts (17) (18) with the wire (19), which are composed of Au small wires, respectively, by means of the wire bonding method. Next, in Fig. 2C, in order to integrate the above-mentioned external electrode parts (17) (18), which are being installed on the substrate (11) that is shown in Fig. 2B, chip connection part (16), chip (15), and wire (19), establish the resin molding layer (20), which is composed of an epoxy, onto the above-mentioned substrate (11) by means of the well-known transfer-molding method. In this implemented example, the thickness "t" of the above-mentioned resin molding layer (20) has been set to 1 [mm].

Next, in Fig. 2C, only the Fe is etched selectively, however, the resin molding layer (20) and Au layer (12) are not etched practically by spray-etching from the back side (11a) of substrate (11) with such a solution like a ferric chloride (FeCl_3) for example, by which the etching can be avoided, so that the above-mentioned substrate (11) is removed, and that the lead-less type packaging (21) that is shown in Fig. 2D can be completed. Among the bottom surfaces of the Au layer (12), which were exposed by the previous etching, the external electrode parts (17) (18) at the bottom surface of the Au layer (12) turn out to be the external electrode surfaces (12b) (12c), and the bottom surface of the Au layer (12) at the chip connection part (16) turns out to be the

heat dissipation surface (12a).

When installing the packaging (21), which was completed throughout the above-mentioned process, onto the printed substrate, the above-mentioned external electrode surfaces (12b) (12c) that are shown in Fig. 2D can be connected directly to the conductor patterns on the printed substrate by soldering.

The above-mentioned heat dissipation surface (12a) in No. 1 Implemented Example turns out to be a heat dissipation surface for the heat that is generated by the chip (15) while it is working. Since the heat conductivity of a metal is extremely high, the heat that is generated by the chip (15) flows very quickly towards outside alongside the chip connection part (16), which is made of a metal, and removed effectively through the heat dissipation surface (12a). However, in order to remove the heat that is generated by the chip (15) more effectively, it is desirable that a part of the heat dissipation fins, which all together possess a broad surface area, is pushed to the above-mentioned heat dissipation surface (12a), so that the heat is removed through air cooling.

Since the packaging (21), which is explained in No. 1 Implemented Example, can be produced by such a simple process that is shown in Fig. 2A ~ 2D, the equipment which is being used for the conventional method can be utilized throughout the entire process. Not only that, those special equipment which was mentioned previously and required for producing the chip-carrier type packaging is needed at here. Therefore, it is possible that to produce the lead-less type packaging (21) for semiconductor equipment, which has a high heat dissipation capacity as well as with more reliable capabilities, through an automated, simple, and less expensive ways. Moreover, in the above-mentioned No. Implemented Example, the transfer-molding method is employed as the method of forming the resin molding layer (20). This transfer-molding method will provide such an advantage that not only producing a reliable resin molding material, but also makes it possible

to produce the packaging in an automated manner, based on its easy molding automation and mass-production features.

In the above-mentioned No. 1 Implemented Example, just like the case that is shown in Fig. 2A, by slightly etching the upper surface of the substrate (11) with the previously mentioned FeCl_3 solution after having installed the chip connection part (16) and external electrode parts (17) (18), the undercut parts (11a) ~ (11f) can be formed on the substrate (11), which is under the chip connection part (16) and external electrode parts (17) (18), as shown in Fig. 4A, and the packaging (21) that is shown in Fig. 4B can be completed in the same method as shown in Fig. 2B ~ 2D. In this way, since the above-mentioned undercut parts (11a) ~ (11f) can be formed at the bottom of the chip connection part (16) and external electrode parts (17) (18) by means of the etching, which was described previously, the protruded parts (20a) ~ (20f) can be formed with the resins filling up the parts. Therefore, the above-mentioned chip connection part (16) and external electrode parts (17) (18) are supported by these protruded parts (20a) ~ (20f) from the bottom subsequently, and that the chip connection part (16) and external electrode parts (17) (18) can be prevented from falling off from the resin-molding layer (20) while the packaging (21) is used.

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Moreover, as the chip connection part (16) and external electrode parts (17) (18) are formed in such a way that not being protruded from the bottom surface of the resin molding layer (20), both of these chip connection part (16) and external electrode parts (17) (18) can be protected further.

Fig. 5A ~ 5C are showing the process diagrams to explain the production method of packaging for semiconductor equipment, which is related to this invention by using No. 2 Implemented Example. In the following, the process is explained starting from Fig. 5A and in order.

First of all, in Fig. 5A, after having sprayed the well-known photo-resist on to the top surface of the substrate (11), which is 35 [μ] thick and made of Cu, execute the specific patterning. Next, by using such a solution like a ferric chloride (FeCl_3) that is previously mentioned for example, and by which only the Cu can be selectively etched, the surface of the above-mentioned substrate (11) is slightly etched, so that the chip connecting part (11g) and external electrode connecting parts (11h) (11i) can be formed individually on the surface of the above-mentioned substrate (11). And, after having removed the above-mentioned photo-resist, connect the chip (15) to the above-mentioned chip connecting part (11g) through the soldering layer (23), just as it was done in Fig. 5B for No.1 Implemented Example, and connect the chip (15) and above-mentioned external electrode parts (11h) (11i) with the wire (19), which are composed of Au small wires, respectively, by means of the wire bonding method. In this implemented example, however, a larger diameter of wire than the one that was used for No. 1 Implemented Example was used, due to the reasons that would be explained later in this report. Next, establish the resin molding layer (20) on the above-mentioned substrate (11), just as the same way that was done for No. 1 Implemented Example. And, next complete the packaging (24) by removing the etching on the above-mentioned substrate (11), just as the same way that was done for No. 1 Implemented Example. The end part of wire (19), which was exposed by the previous etching turns out to be the external electrode parts (17) (18), and the bottom surface of the soldering layer (24) turns out to be the heat dissipation surface (23a).

When installing the packaging (24), which was completed throughout the above-mentioned process, onto the printed substrate, the above-mentioned external electrode parts (17) (18) that are shown in Fig. 5D can be connected directly to the conductor patterns on the printed substrate by soldering, the same way that was used for No. 1 Implemented Example. As it is clear now by

the above reasons, since the ends of the wire (19) are used as the external electrode parts (17) (18) in this implemented example, it is desirable to use the larger diameter of wire (19) as it was mentioned previously. The function of the heat dissipation surface (23a) is the same as it was for No. 1 Implemented Example.

The packaging (24) for the above-mentioned No. 2 Implemented Example is a little different from the packaging (21) for No. 1 Implemented Example, and the external electrode connection parts (11h) (11i), which were installed during the photo-resist and etching processes, are being connected directly to the wire (19), thus requiring no formations of the Au layer (12)(14) and Ni layer (13) that had been established for the packaging of No. 1 Implemented Example. The photo-resist and etching processes for the above case is much simpler compared with the plating process that was used for the packaging (21) for No. 1 Implemented Example. Also, by implementing this photo-resist and etching processes, the usage of such a precious metal like Au is going to be eliminated.

In the above-mentioned No. 1 and No. 2 Implemented Examples, it was mentioned with regard to a single chip to be installed at the single chip connection part and resin molding. However, based on this prototype idea, it is also possible to produce multiple numbers of packaging, all of which will have a single chip individually, at the same time, by installing multiple numbers of chip connection parts on a substrate, attaching multiple numbers of chips individually, resin molding in an integrated manner, and finally cut into the pieces. Furthermore, after having installed various kinds of chips and passive devices such as, condenser and resistors onto the substrate, and resin molding integrally, it is possible to produce the packaging that will have a various kind of functions, as well as the ones with highly integrated circuit element.

As the materials for the substrate for the above-mentioned No. 1 Implemented Example, it may

be another type of metal, such as Cu and the like, as long as the selective etching is possible, and by the same token, the materials for the substrate for the above-mentioned No. 2 Implemented Example, it may be some other type of metal, such as Fe and the like. Moreover, in the case of No. 1 Implemented Example, some other type of materials such as, polyimide type resin can be used as well. In this case,

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however, a mixture of hydrazine and ethylenediamine can be used as the etching liquid that was mentioned previously.

Effect of the Invention:

By the production method of packaging for semiconductor equipment, which is related to this invention, it is possible to produce the small size of packaging, which has a high heat dissipation capacity for the heat that is generated by the semiconductor equipment at the time of operation, as well as with more reliable capabilities, through an automated, relatively simple, and less expensive way.

4. Brief Descriptions for Sketched Diagrams

Fig. 1 shows the sectional view of chip-carrier type packaging construction of the conventional plastic type, and Fig. 2A ~ 2D are showing the process diagrams to explain the production method of packaging for semiconductor equipment, which is related to this invention by using No. 1 Implemented Example. Fig. 3 shows the plan view of substrate on which the process that is shown in Fig. 2A has been completed, and Fig. 4A and 4E are showing the similar views as the previous Fig. 2A ~ 2D, which are showing the deformed example of above-mentioned No. 1 Implemented Example. Fig. 5A ~ 5C are showing the process diagrams to explain the production

method of packaging for semiconductor equipment, which is related to this invention by using
No. 2 Implemented Example.

And, in these diagrams, the following Item Numbers are representing;

- (1), (21), (22), and (24) ----- Packaging
- (2), and (15) ----- Chip
- (3), and (19) ----- Wire
- (11) ----- Substrate
- (11h), and (11i) ----- External Electrode Connection Parts
- (17), and (18) ----- External Electrode Part
- (20) ----- Resin Molding Layer

Representatives for the applicant: Masaru Tsuchiya

Yoshio Tsunetsutsumi

Toshiki Sugiura

Fig. 1

Fig. 2A

Fig. 2B

Fig. 2C

Fig. 2D

Fig. 3

Fig. 4A

Fig. 4B

Fig. 5A

Fig. 5B

Fig. 5C

AFFIDAVIT

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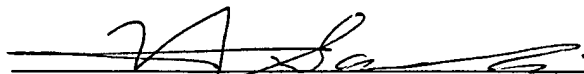
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⑥ 半導体装置のパッケージの製造方法

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③ 発 明 者 秋山克彦

東京都品川区北品川6丁目7番

35号ソニー株式会社内

④ 発 明 者 小野鉄雄

東京都品川区北品川6丁目7番

35号ソニー株式会社内

⑤ 発 明 者 堤山雄次

東京都品川区北品川6丁目7番

35号ソニー株式会社内

⑥ 出 願 人 ソニー株式会社

東京都品川区北品川6丁目7番

35号

⑦ 代 理 人 弁理士 土屋勝

外2名

明 細 書

1. 発明の名称

半導体装置のパッケージの製造方法

2. 特許請求の範囲

選択エッチング可能な材料から成る基板上に半導体装置を敷設し、接続用ワイヤを上記半導体装置に接続すると共にこの接続用ワイヤの外部電極部を上記基板の外部電極接続部位に接続し、ないで上記基板上において上記半導体装置及び上記接続用ワイヤを一体に樹脂をモールドし、しかも使上記基板をエッチング除去することを特徴とする半導体装置のパッケージの製造方法。

3. 発明の詳細な説明

従来の利用分野

本発明は、半導体装置のパッケージの製造方法に関する。

4. 技術とその問題点

従来、プリント基板上の実装部位の高いパッケージとして、チップキャリアタイプのパッケージが知られている。このパッケージはリードレ

タイプのパッケージで、パッケージの端面に引よせられているハンダ付け可能な電極をプリント基板の導体パッドに直接ハンダ付けして接続することにより実装を行うものである。

このチップキャリアタイプのパッケージには、セフミンクタイプとブラスタックタイプとがある。セフミンクタイプはパッケージ自体が角部であるばかりでなく、プリント基板に直接ハンダ付けすると、熱膨張率の差によりセフミンクと上記ハンダ及び上記導体との間の熱膨張係数の差によつて接続部にはひびやクラックが生じる恐れがあるという欠点を有している。一方、ブラスタックタイプはパッケージが角部であるという利点を有しているが、熱膨張係数の差、また形状がパッケージの製造の自動化に適していないという欠点を有している。

このような従来のブラスタックタイプのチップキャリアタイプのパッケージの構造を第1図に示す。このパッケージ(1)は、銅箔製の電極(2)が平面的形成されているプリント基板(3)上に半導体装置を構成

するチップ(4)を搬出し、ワイヤボンディング法により上記チップ(4)と上記電極(2)の一端とをAuの糊剤から成るワイヤ(5)で接合した後、上方より液状のエポキシ樹脂を滴下させて硬化成形することによつて作る。

このパッケージ(1)において、チップ(4)は樹脂層(6)とプリント基板(3)とによつて固まっている。これらの樹脂層(6)及びプリント基板(3)の熱抵抗は共に大きいので、その動作時においてチップ(4)で発生する熱をパッケージ(1)の外部に効果的に放散することができない。即ち、このパッケージ(1)は放散性が低いという欠点を有している。また上記の液状のエポキシ樹脂を滴下する際に、液量の調節を一定量、しかも高速で滴下することが難しく、このためにパッケージ(1)はパッケージの製造の自動化に適していないという欠点を有している。

一方、上述のテンプマリアタイプパッケージとは異なるパッケージにテープマリアタイプパッケージがある。このタイプのパッケージは従来のテンプマリアタイプパッケージよりもさらに

小形化できるという利点を有するが、チップが樹脂層によつて完全に覆われているため熱放散性が良好でないこと、テープを用いているために特殊な装置が必要である等の欠点を有している。

発明の目的

本発明は、上述の問題にかんがみ、熱放散性が良好かつ信頼性の高い半導体装置のパッケージの製造方法を提供することを目的とする。

発明の概要

本発明に係る半導体装置のパッケージの製造方法は、選択エッチング可能な材料から成る基板上に半導体装置を搬出し、接続用ワイヤを上記半導体装置に接続すると共にこの接続用ワイヤの外部電極部を上記基板の外部電極接続部位に接続し、次いで上記基板上において上記半導体装置及び上記接続用ワイヤを一体に樹脂モールドし、しかる後上記基板をエッチング除去するようにしている。このようにすることによつて、熱放散性が良好かつ信頼性の高いリードレスタイプのパッケージを、簡便かつ安価な方法によつて自動的に製造す

ることが出来る。なお上記外部電極部は上記接続用ワイヤ自体が兼ねていてもよいし、上記接続用ワイヤとは別に設けられかつ上記接続用ワイヤが接続されているものでもよい。

実施例

以下本発明に係る半導体装置のパッケージの製造方法の実施例につき図面を参照しながら説明する。

第2A図～第2D図は本発明の第1実施例による半導体装置のパッケージの製造方法を説明するための工程図である。以下第2A図から工程図に説明する。

まず第2A図において、長さ $5(\mu)$ のFeの基板(1a)の上に、長さ $1(\mu)$ のAu層(2a)、長さ $1(\mu)$ のNi層(2b)及び長さ $3(\mu)$ のAu層(2c)を形成し、半導体装置を形成するチップ(4)の接続部(4a)及び外部電極部(4b)のそれぞれを上記基板(1a)の所定のチップ搬送部位(11a)及び外部電極接続部位(11b)(11c)のそれぞれに設ける。第2A図に示す工程終了後の上記基板(1a)の平面図を第

3図に示す。次に第2B図において、上記チップ搬送部(4a)にチップ(4)を搬出した後、ワイヤボンディング法によつてこのチップ(4)と上記外部電極部(4b)とをそれぞれAuの糊剤から成るワイヤ(5)で接合する。次に第2C図において、第2B図の基板(1a)の上に設けられた上記外部電極部(4b)、チップ(4)及びワイヤ(5)を一体とするために、公知のトランスファーマーモールド法(移送成形法)を用いて、エポキシから成る樹脂モールド層(6)を上記基板(1a)上に形成する。なお本実施例においては、上記樹脂モールド層(6)の厚さ t を $1(\mu)$ とした。

次に第2D図において、Feのみを選択的にエッチングするが樹脂モールド層(6)及びAu層(2c)はエッチングしないエッチング液、例えば塩化第二鉄($FeCl_2$)溶液を用いて、基板(1a)の表面(11a)側からスプレーエッチングすることにより、上記基板(1a)を除去して、第2D図に示すリードレスタイプのパッケージ(1)を完成させる。上記エッチングによつて露出されたAu層(2c)の下面のうち外部

電極部104のAu層102の下面が外部電極面(12b)(12c)となり、またチップ設置部104のAu層102の下面が熱放散面(12a)となる。

上述のようにして完成されたパッケージ100をプリント基板上に実装する場合には、第2D図に示す上記外部電極面(12b)(12c)をプリント基板上の導体パタンに直接ハンダ付けして接続すればよい。

上述の第1実施例の熱放散面(12a)は、その動作時においてチップ104から発生する熱の放散面となつてゐる。金属の熱伝導率は非常に高いので、チップ104から発生する熱は金属製のチップ設置部100を外方に向かつて迅速に放れて、熱放散面(12a)から放散されることによつて効果的に除去される。しかし、より効果的にチップ104の発生熱を除去するためには、広い表面積を有する放熱フィンの一部を上記熱放散面(12a)に押し当てて空冷により熱を放散させるのが好ましい。

上述の第1実施例のパッケージ100は第2A図～第2D図に示すような簡単な工程によつて作ること

完成させることができる。このように上記のエンタングによつてチップ設置部104及び外部電極部104の下部に上記アンダーコート部(11a)～(11f)が形成されるので、これらの部分に樹脂が回り込んで突出部(20a)～(20f)が形成される。従つてこれらの突出部(20a)～(20f)によつて上記チップ設置部104及び上記外部電極部104が下方から保持される構造となるので、上記チップ設置部104及び上記外部電極部104がパッケージ100の使用時において樹脂モールド層102から抜け出してしまうのを防止することができるという利点がある。さらにチップ設置部104及び外部電極部104が樹脂モールド層102の下面から突出することなく形成されるので、これらのチップ設置部104及び外部電極部104を保護することができるという利点もある。

第5A図～第5C図は本発明の第2実施例による半導体装置のパッケージの製造方法を説明するための工程図である。以下第5A図から工程順に説明する。

まず第5A図において、厚さ5[μ]のCu

とができるばかりでなく、全ての製造工程に従来から用いられている装置を用いることができるので、テープキャリアタイプのパッケージにおいて必要な特殊な装置が不要である。従つて、簡便かつ安価な方法によりパッケージ100を製造することができる。さらに上述の第1実施例では樹脂モールド層102を形成する方法としてトランスファ・モールド法(移送成形法)を用いている。この方法は信頼性の高い樹脂封止ができるばかりでなく、モールドの機械化、自動化が容易であるためにパッケージを自動的に製造できるという利点を有している。

なお上述の第1実施例において、第2A図に示す場合と同様にチップ設置部104及び外部電極部104を設けた後に、基板100の上面を前述のFCC、樹脂を用いて僅かにエンタングすることにより、第4A図に示すようにチップ設置部104及び外部電極部104の下部の基板100にアンダーコート部(11a)～(11f)を形成し、次に第2B図～第2D図と同様な方法によつて第4B図に示すパッケージ100を

製の基板100の上面に公知のフォトリソストを塗布した後に所定のパターンニングを行う。次にCuのみを選択的にエンタングするエンタング液、例えば前述のFCC、樹脂を用いて上記基板100の表面を僅かにエンタングすることによつて、上記基板100の表面にチップ設置部104及び外部電極部104の表面にチップ設置部104(11g)及び外部電極部104(11h)(11i)をそれぞれ形成する。上記フォトリソストを除去した後に第5B図において、第1実施例と同様に、上記チップ設置部104(11g)にハンダ層102を介してチップ104を取付けた後、ワイヤボンディング法によつてこのチップ104と上記外部電極部104(11h)(11i)とをそれぞれAgの理論から成るワイヤ104で接続する。なお本実施例においては、前述の理由により、第1実施例で用いたワイヤよりも径の大きいワイヤを用いた。次に第1実施例と同様に樹脂モールド層102を上記基板100上に形成する。次に上記基板100を第1実施例と同様な方法でエンタング除去してパッケージ100を完成させる。上記エンタングにより露出されたワイヤ104の両端が外部電極部104となり、またハ

ンダ用四の下面が熱放散面(23a)となる。

上述のようにして実装されたパッケージ10をプリント基板上に実装する場合には、第1実施例と同様に、第5C図に示す上記外部電極部10aをプリント基板上の導体パタンに直接ハンダ付けして接続すればよい。このことから明らかなように、本実施例においてはワイヤ時の放散面をそのまま外部電極部10aとして用いるために、ワイヤ時の接合を前述のように大きくするのが好ましい。なお熱放散面(23a)の構成は第1実施例と同様である。

上述の第2実施例のパッケージ10は、第1実施例のパッケージ10と異なつて、フォトレジスト工法及びエッチング工法によつて基板11に形成された外部電極接続部11a(11b)にワイヤ15を直接接続するようにしている。第1実施例のパッケージ10におけるAu層10a及びNi層10bを形成する必要がない。上記のフォトレジスト工法及びエッチング工法は第1実施例のパッケージ10で用いたメッキ工法よりもさらに簡便である。またこれらのフォトレジスト工法及びエッチング工法

を用いることにより、Au等の貴金属を用いる必要がなくなるという利点がある。

上述の第1実施例及び第2実施例においては、1個のチップをチップ載置部に設置してこれを樹脂モールドする場合につき述べたが、基板上に多数のチップ載置部を設け、それぞれのチップ載置部に同一のチップを設置して、これらのチップを一体に樹脂モールドした後に切断分離することにより、それぞれ1個のチップを有する同一のパッケージを多数個同時に作ることもできる。また前述のチップと、コンデンサや抵抗等の受動素子を基板上に設置した後にこれらを一体に樹脂モールドすれば、種々の機能を有するパッケージを作ることができると共に、回路素子の集積度の高いパッケージを作ることができるという利点がある。

上述の第1実施例の基板の材料は選択エッチングが可能であればCu等の他の金属であつてもよく、また第2実施例の基板の材料もFe等の他の金属であつてもよい。第1実施例においてはさらに金属以外の材料、例えばポリイミドアミド系樹

脂を用いることも可能である。この場合には前述のエッチング液としては、ヒドラジンとエタレンジアミンとの混合液を用いればよい。

発明の効果

本発明に係る半導体装置のパッケージの製造方法によれば、その製作時において半導体装置から発生する熱の放散性が良好でありかつ信頼性が高い小型のパッケージを、極めて簡便かつ安価な方法によつて自動的に製造することができる。

4 図面の簡単な説明

第1図は従来のプラステックタイプのチップキャリアタイプパッケージの構造を示す断面図、第2A図～第2D図は本発明の第1実施例による半導体装置のパッケージの製造方法を説明するための工程図、第3図は上記第2A図に示す工程終了後の基板の平面図、第4A図及び第4B図は上記第1実施例の成形例を示す上記第2A図～第2D図と同様な図、第5A図～第5C図は本発明の第2実施例による半導体装置のパッケージの製造方法を説明するための工程図である。

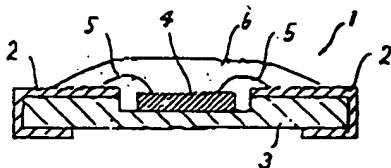
なお図面に用いた符号において、

(12)(23a)	パッケージ
11a	チップ
15	ワイヤ
10	基板
(11a)(11b)	外部電極接続部位
10a	外部電極部
20	樹脂モールド層

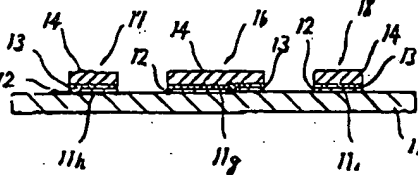
である。

代	理	人	士	氏	名
			常	包	有
			杉	浦	俊

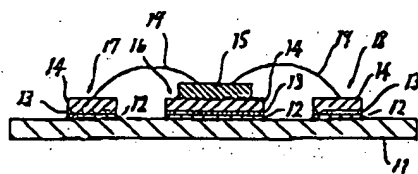
第 1 図



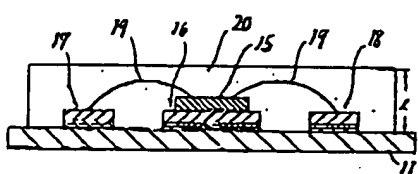
第 2 A 図



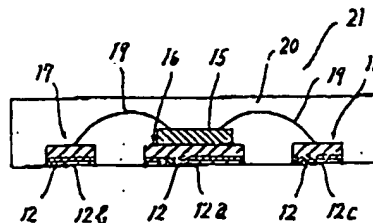
第 2 B 図



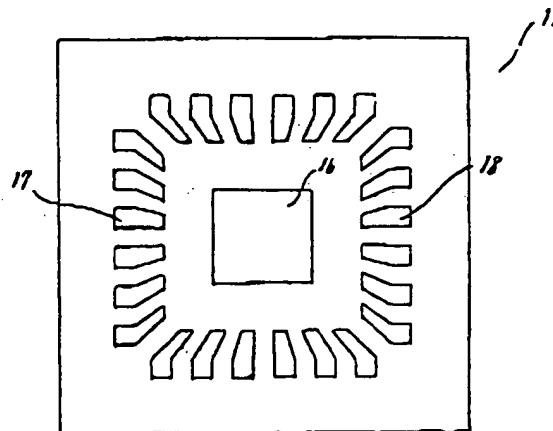
第 2 C 図



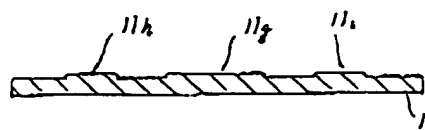
第 2 D 図



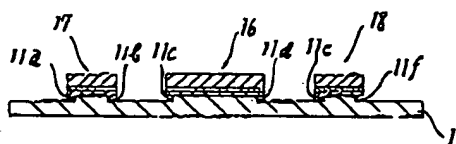
第 3 図



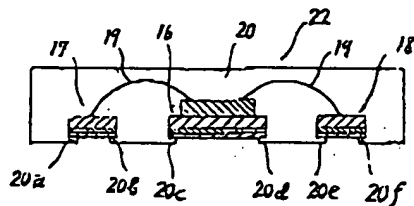
第 5 A 図



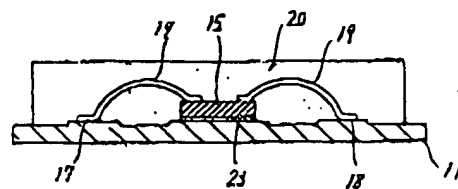
第 4 A 図



第 4 B 図



第 5 B 図



第 5 C 図

